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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/578,192	05/04/2006	Shigeru Hanzawa	127902	8431

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EXAMINER	
BERNSTEIN, DANIEL A	

ART UNIT	PAPER NUMBER
3743	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/578,192	HANZAWA ET AL.	
	Examiner	Art Unit	
	DANIEL A. BERNSTEIN	3743	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *1/15/09*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04 May 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 20-21 rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification does not describe a "batch kiln" as originally presented.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-19 rejected under 35 U.S.C. 103(a) as being unpatentable over US 2002/0003322 to Dull et al. in view of US 4,995,807 to Rampley et al.

In reference to claims 1

Dull discloses a furnace comprising a heating unit (combustion burner 26, Fig.2), a furnace body (tunnel kiln 10) that can degrease an article (release of carbonaceous material, [0020]) to be degreased by heating the article with the heating unit ([0035]),

and a treatment gas-introducing unit (return delivery system 46), the article being disposed in the furnace body and containing an organic substance (organic or carbonaceous material [0011]), wherein the furnace body includes an outlet (exhaust system 42) for discharging a degreasing gas containing a small amount of gaseous oxygen and a large amount of gaseous organic decomposition products generated in an internal section (carbonaceous release region 40) of the furnace body during the degreasing of the article and also includes an inlet (low oxygen gas through the inlet of the combustion air blower supplying the burners [0035]) for receiving a dilution gas, from outside, for reducing the concentration of the gaseous organic decomposition products in the furnace body to prevent the explosion of the gaseous organic decomposition products (dilution gas prevents lower explosive limit from being attained [0020]); the heating unit includes a first heater (combustion burner 26, Fig. 2) that can heat and degrease the article disposed in the furnace body and a second heater (afterburner 44) which heats the degreasing gas (burns partially reacted and unreacted carbonaceous material remaining in exhaust gas [0044]) discharged from the outlet (42) of the furnace body such that the gaseous organic decomposition products are removed ([0044]) and such that the degreasing gas is converted into a treatment gas containing a small amount of gaseous oxygen (treated exhaust gas is then returned back into the kiln carbonaceous release region [0044]); the treatment gas-introducing unit (46) is used to introduce the treatment gas for dilution (dilution effect, low oxygen content gas, [0041]) into the internal section of the furnace body from the second heater (44) through the inlet and/or the first heater (26); and the treatment gas is introduced into the internal

section (material release region 12) of the furnace body from the inlet and/or the first heater in such a manner that the treatment gas is circulated through the internal section of the furnace body, the outlet, the second heater, the treatment gas-introducing unit, and the inlet and/or the first heater (treatment gas is circulated through 46 and reintroduced into 12), whereby the concentration of the gaseous organic decomposition products in the internal section of the furnace body is reduced such that explosion is prevented (Dull's circulation of low oxygen content gases reduces both the temperature gradient and unwanted combustion of gases thereby reducing cracking [0020]), whereby the concentration of gaseous oxygen in the internal section of the furnace body is maintained low such that the article is prevented from being cracked due to the abnormal combustion of the gaseous organic decomposition products, and whereby the article can be degreased in a short time and then subjected to a subsequent firing step.

Dull also discloses **the furnace further comprising: a heat exchanging unit** (48 Fig. 3) **downstream the first heater** (48 is downstream the kiln organic release region as shown in Fig. 3) **and upstream the treatment gas-introducing unit** (the treatment gas introducing unit 46 includes bypass line 50 and air bleeds 52 and 54. 54 is upstream the heat exchanger)**, wherein the treatment gas, after going through the heat exchanging unit, is divided into two parts** (part of the exhaust gases from the heat exchanger are bled from bleed valve 54 and the rest is supplied back to 40, Fig. 3)**, including a heat exchange gas** (exhaust gas exits the heat exchanger and flows back into 40, see Fig. 3 and [0044])**that gets circulated back to the furnace body** (40),

and an exhaust gas (the exhaust gas released from bleed valve 54) **that is output from the furnace without being further circulated back to the furnace body.**

Dull does not teach **a blower provided at the treatment gas-introducing unit, wherein the blower circulates the treatment gas into the furnace body, and circulates the heat exchange gas back into the furnace body.**

Rampley teaches a blower (blower 136, Fig. 3) that facilitates the recirculation of flue gases back into a combustion chamber (120) through the burner nozzle. Referring to Fig. 3 of Rampley, the combustion product (called flue or exhaust gases) flow through a heat exchanger 122 where part of the exhaust gases exit through flue 128 (shown as direction arrow 130) and a portion of the exhaust gases are recirculated back through pipe 134 (direction arrow 132) into combustion chamber 120.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Dull with Rampley for the purpose of facilitating and accelerating the flow of recirculated exhaust gases back into the furnace body. Rampley teaches that it is well known to recirculate exhaust gases exiting a heat exchanger back into the combustion chamber for the purpose of diluting the fuel gas with an inert gas before the fuel gas is supplied to the burner in the combustion chamber (see abstract of Rampley). Therefore, it would have been obvious to combine Dull with Rampley, because all of the claimed elements were known in prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

In reference to claims 2

In regards to the rejection of claim 2 see the rejection of claim 1 above. Claim 2 recites the same claimed subject matter as above in claim 1. The only discernable difference between claims 1 and 2 is that claim 2 is claiming one heater instead of a first and second heater. Claim 2 does not narrow the scope of the claim and therefore the 103 (a) rejection of claim 1 also can be applied to claim 2.

In reference to claims 3

Dull in view of Rampley discloses the furnace according to claim 1, further comprising a low-oxygen content gas-introducing unit (delivery conduit 16 and 26, also see [0035] for low oxygen content, Dull) for introducing a low-oxygen content gas, different in supply line from the treatment gas (16 is a separate delivery conduit than 46, Dull), into the internal section of the furnace body in addition to or instead of the treatment gas-introducing unit.

In reference to claims 4

Dull in view of Rampley discloses the furnace according to claim 1, wherein the organic substance contains at least one selected from the group consisting of polyvinyl alcohol, polyethylene glycol, starch, methylcellulose, carboxymethylcellulose, hydroxyethylcellulose, hydroxypropylmethylcellulose, polyethylene oxide, sodium polyacrylate, polyacrylamide, polyvinyl butyral, ethylcellulose, cellulose acetate, polyethylene, an ethylene-vinyl acetate copolymer, polypropylene, polystyrene, an acrylic resin, polyamide, glycerin, polyethylene glycol, and dibutyl phthalate (organic

binders and plasticizers and lubricants, mentions at least one, carboxymethlcellulose [0004], Dull).

In reference to claims 5

Dull in view of Rampley discloses the furnace according to claim 1, wherein the concentration of gaseous oxygen in the internal section of the furnace body is maintained at 0.5 to 17 volume percent using the treatment gas (page 6 Table IV shows oxygen levels within that range, Dull).

In reference to claims 6

Dull in view of Rampley discloses the furnace according to claim 1, wherein the first to second heaters are gas burners (combustion burner 26 and afterburner 44 are gas burners, Dull).

In reference to claims 7

Dull in view of Rampley discloses the furnace according to claim 1, wherein the treatment gas-introducing unit includes a sealed pipe for communicatively connecting the second heater to the furnace body (the distribution system of the tunnel kiln comprises a series of independently metered, individually piped delivery conduits [0033], Dull).

In reference to claims 8

Dull in view of Rampley discloses the furnace according to claim 1, further comprising a heat-exchanging unit disposed between the second heater and the treatment gas-introducing unit (see heat exchanger Fig. 3, Dull).

In reference to claims 10 and 12

Dull discloses a degreasing method comprising a step of degreasing an article to be degreased using a furnace including a heating unit (combustion burner 26, Fig. 2), a furnace body (tunnel kiln 10), and a treatment gas-introducing unit (return delivery system 46) by heating the article ([0035]) with the heating unit and a firing step subsequent to the degreasing step, the article being disposed in an internal section of the furnace body (ceramic material is fired by the tunnel kiln [0032]) and containing an organic substance ([0011]), wherein the furnace body includes an outlet (exhaust system 42) for discharging a degreasing gas containing a small amount of gaseous oxygen and a large amount of gaseous organic decomposition products generated in the internal section (carbonaceous release region 40) of the furnace body during the degreasing of the article and also includes an inlet (low oxygen gas through the inlet of the combustion air blower supplying the burners [0035]) for receiving a dilution gas, from outside, for reducing the concentration of the gaseous organic decomposition products in the furnace body to prevent the explosion of the gaseous organic decomposition products (dilution gas prevents lower explosive limit from being attained [0020]); the heating unit includes a first heater (combustion burner 26) that can heat and degrease the article disposed in the furnace body and a second heater (afterburner 44) which heats the degreasing gas (burns partially reacted and unreacted carbonaceous material remaining in exhaust gas [0044]) discharged from the outlet (42) of the furnace body such that the gaseous organic decomposition products are removed ([0044]) and such that the degreasing gas is converted into a treatment gas containing a small amount of gaseous oxygen (treated exhaust gas is then returned back into the kiln

carbonaceous release region [0044]); the treatment gas-introducing unit (46) is used to introduce the treatment gas for dilution ([0041]) into the internal section of the furnace body from the second heater (44) through the inlet and/or the first heater (26); and the treatment gas is circulated through the internal section (material release region 12) of the furnace body, the outlet, the second heater, the treatment gas-introducing unit, and the inlet and/or the first heater (treatment gas is circulated through 46 and reintroduced into 12), whereby the concentration of the gaseous organic decomposition products in the internal section of the furnace body is reduced such that explosion is prevented (Dull's circulation of low oxygen content gases reduces both the temperature gradient and unwanted combustion of gases thereby reducing cracking [0020]), whereby the concentration of gaseous oxygen in the internal section of the furnace body is maintained low such that the article is prevented from being cracked due to the abnormal combustion of the gaseous organic decomposition products, and whereby the article can be degreased in a short time and then subjected to the subsequent firing step (carbonaceous release region 100-600 deg C [0032], which is the step before firing).

Dull also discloses **the furnace further comprising: a heat exchanging unit** (48 Fig. 3) **downstream the first heater** (48 is downstream the kiln organic release region as shown in Fig. 3) **and upstream the treatment gas-introducing unit** (the treatment gas introducing unit 46 includes bypass line 50 and air bleeds 52 and 54. 54 is upstream the heat exchanger)**, wherein the treatment gas, after going through the heat exchanging unit, is divided into two parts** (part of the exhaust gases from the

heat exchanger are bled from bleed valve 54 and the rest is supplied back to 40, Fig. 3), **including a heat exchange gas** (exhaust gas exits the heat exchanger and flows back into 40, see Fig. 3 and [0044]) **that gets circulated back to the furnace body** (40), **and an exhaust gas** (the exhaust gas released from bleed valve 54) **that is output from the furnace without being further circulated back to the furnace body.**

Dull does not teach **a blower provided at the treatment gas-introducing unit, wherein the blower circulates the treatment gas into the furnace body, and circulates the heat exchange gas back into the furnace body.**

Rampley teaches a blower (blower 136, Fig. 3) that facilitates the recirculation of flue gases back into a combustion chamber (120) through the burner nozzle. Referring to Fig. 3 of Rampley, the combustion product (called flue or exhaust gases) flow through a heat exchanger 122 where part of the exhaust gases exit through flue 128 (shown as direction arrow 130) and a portion of the exhaust gases are recirculated back through pipe 134 (direction arrow 132) into combustion chamber 120.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to combine Dull with Rampley for the purpose of facilitating and accelerating the flow of recirculated exhaust gases back into the furnace body. Rampley teaches that it is well known to recirculate exhaust gases exiting a heat exchanger back into the combustion chamber for the purpose of diluting the fuel gas with an inert gas before the fuel gas is supplied to the burner in the combustion chamber (see abstract of Rampley). Therefore, it would have been obvious to combine Dull with Rampley, because all of the claimed elements were known in prior art and one

skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

Claims 10 and 12 are identical except for the mention of one "heater" in claim 12 instead of a "second heater" in claim 10. Also see rejection of claims 1 and 2.

In reference to claims 11

Dull in view of Rampley discloses the degreasing method according to claim 10, wherein the treatment gas is circulated through the internal section of the furnace body, the outlet, the second heater, the treatment gas-introducing unit, and the inlet without operating the first heater (see Fig. 3 where circulation of the treatment gas does not pass through the first burner 26, Dull).

In reference to claims 13

Dull in view of Rampley discloses the degreasing method according to claim 10, further comprising a low-oxygen content gas-introducing unit (delivery conduit 16 and 26, also see [0035] for low oxygen content, Dull) for introducing a low-oxygen content gas, different in supply line from the treatment gas (16 is a separate delivery conduit than 46, Dull), into the internal section of the furnace body in addition to or instead of the treatment gas-introducing unit.

In reference to claims 14

Dull in view of Rampley discloses the degreasing method according to claim 10, wherein the organic substance contains at least one selected from the group consisting of polyvinyl alcohol, polyethylene glycol, starch, methylcellulose, arboxymethylcellulose,

hydroxyethylcellulose, hydroxypropylmethylcellulose, polyethylene oxide, sodium polyacrylate, polyacrylamide, polyvinyl butyral, ethylcellulose, cellulose acetate, polyethylene, an ethylene-vinyl acetate copolymer, polypropylene, polystyrene, an acrylic resin, polyamide, glycerin, polyethylene glycol, and dibutyl phthalate (organic binders and plasticizers and lubricants, mentions at least one, carboxymethlcellulose [0004], Dull).

In reference to claims 15

Dull in view of Rampley discloses the degreasing method according to claim 10, wherein the concentration of gaseous oxygen in the internal section of the furnace body is maintained at 0.5 to 17 volume percent using the treatment gas (page 6 Table IV shows oxygen levels within that range, Dull).

In reference to claims 16

Dull in view of Rampley discloses the degreasing method according to claim 10, wherein the first to second heaters are gas burners (combustion burner 26 and afterburner 44 are gas burners, Dull).

In reference to claims 17

Dull in view of Rampley discloses the degreasing method according to claim 10, wherein the treatment gas-introducing unit includes a sealed pipe for communicatively connecting the second heater to the furnace body (the distribution system of the tunnel kiln comprises a series of independently metered, individually piped delivery conduits [0033], Dull).

In reference to claims 18

Dull in view of Rampley discloses the degreasing method according to claim 10, further comprising a heat-exchanging unit and/or catalyst disposed between the second heater and the treatment gas-introducing unit and/or the low oxygen content gas-introducing unit (see heat exchanger Fig. 3, Dull).

In reference to claims 9 and 19

Dull in view of Rampley discloses the percentage of inorganic and organic compounds in batch 1 and 2 ([0049], Dull) before the article is treated, but he is silent to the percentage of inorganic and organic compounds remaining after the article has been treated.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to treat a ceramic article as disclosed by Dull to achieve a range of inorganic materials remaining in a degreased article to fall within 5% to 60%, for the purpose of preventing cracking in a ceramic specimen during the firing process. Removal of organic and carbonaceous materials is time and temperature dependent. Therefore, it would have been obvious to achieve the range of 5% to 60% through routine experimentation and optimization.

5. Claims 20 and 21 rejected under 35 U.S.C. 103(a) as being unpatentable over Dull in view of Rampley and US 6,168,426 to Yamada.

In reference to claims 20

Dull in view of Rampley discloses the furnace according to claim 1, but does not teach wherein the furnace is configured as a batch kiln.

Yamada teaches a batch kiln (see abstract and batch kiln Fig. 1).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to Combine Dull with Yamada for the purpose of using a batch kiln in the ceramic degreasing system of Dull. Yamada teaches that it is well known to treat a ceramic product in a batch kiln. Therefore, it would have been obvious to someone of ordinary skill in the art to combine Dull and Yamada, because the substitution of one type of known kiln for another type of known kiln would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

In reference to claims 21

Dull in view of Rampley discloses the degreasing method according to claim 10, but does not teach wherein the furnace is configured as a batch kiln.

Yamada teaches a batch kiln (see abstract and batch kiln Fig. 1).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to Combine Dull with Yamada for the purpose of using a batch kiln in the ceramic degreasing system of Dull. Yamada teaches that it is well known to treat a ceramic product in a batch kiln. Therefore, it would have been obvious to someone of ordinary skill in the art to combine Dull and Yamada, because the substitution of one type of known kiln for another type of known kiln would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL A. BERNSTEIN whose telephone number is (571)270-5803. The examiner can normally be reached on Monday-Friday 8:00 AM - 5:00 PM EDT.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Rinehart can be reached on 571-272-4881. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DAB

/Kenneth B Rinehart/

Supervisory Patent Examiner, Art Unit 3743